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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/588,999	06/06/2000	Robert S. Wegeng	12672-E	9320

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Intellectual Property Services  
Battelle Memorial Institute  
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EXAMINER

MEDINA SANABRIA, MARIBEL

ART UNIT	PAPER NUMBER
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1754

DATE MAILED: 01/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/588,999

Applicant(s)

WEGENG ET AL.

Examiner

Maribel Medina

Art Unit

1754

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 13 October 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-12,21-23,25-40 and 50-87 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 2-5,21,35-40,69-72 and 77-87 is/are allowed.
- 6) ☒ Claim(s) 1,6,7,10,22,23,54,58,74 and 75 is/are rejected.
- 7) ☒ Claim(s) 8,9,11,12,25-34,50-53,55-57,59-68,73 and 76 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 June 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>10/30/00;1/30/01;11/04/02</u> | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

#### **Information Disclosure Statement**

1. The information disclosure statements (IDS) submitted on 10/30/2000; 1/30/2001; and 11/4/2002 have been considered by the Examiner.

#### **Drawings**

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description:
  - a. In Figure 5: 210-vaporizer; 220-vaporizer; 230-recuperator; 240-reformer; 260, solid oxide fuel cell; and 270-electrical power (See specification page 23).
  - b. In figure 6: A and B-shims (See specification, page25).
  - c. In Figure 10: 101; 138; 140; and 134 (See specification pages 27 and 28).
  - d. In figures 12 a and b: A, B-shims; 1000 (See specification pages 28 and 29).
  - e. In figure 13 a and b: 184,180,182, and 186 (See specification page 29).
  - f. In Figure 14 c: 202, and 228
3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description:
  - a. In figures 11 a and b: 164 and 172 (See specification page 29).
  - b. In figure 15 e: 360 (See specification page 31).
4. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion

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of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

5. In regards to Figure 10: Color photographs and color drawings are acceptable only for examination purposes unless a petition filed under 37 CFR 1.84(a)(2) is granted permitting their use as acceptable drawings. In the event that applicant wishes to use the drawings currently on file as acceptable drawings, a petition must be filed for acceptance of the color photographs or color drawings as acceptable drawings. Any such petition must be accompanied by the appropriate fee set forth in 37 CFR 1.17(h), three sets of color drawings or color photographs, as appropriate, and, unless already present, an amendment to include the following language as the first paragraph of the brief description of the drawings section of the specification:

The patent or application file contains at least one drawing executed in color. Copies of this patent or patent application publication with color drawing(s) will be provided by the Office upon request and payment of the necessary fee.

Color photographs will be accepted if the conditions for accepting color drawings have been satisfied.

#### **Claim Objections**

6. Claim 57 is objected to because of the following informalities: the claim is incomplete. Appropriate correction is required.

#### **Claim Rejections - 35 USC § 102**

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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8. Claims 1, 6, 7, 10, 22, 23, 54, 58, 74 and 75 are rejected under 35 U.S.C. 102(b) as being anticipated by WO 99/00186 (Tonkovich et al).

Regarding claims 1, 22 and 58, Tonkovich et al disclose a micro component apparatus and method for conducting unit operations comprising: a first inlet (120), a first exit (104), a first array of microchannels (in section 114) and a second array of microchannels (in section 108); wherein, during operation, a steam (working fluid) enters the first inlet (120) of the device and is distributed among said first array of microchannels and first unit operation (i.e. heating of the working fluid) is performed on said stream, said stream exiting through the first exit (104); a processing device (i.e. exothermic reaction chamber) (100) connected to the first exit (104) of the micro component device; said processing device being capable of modifying said stream by a second unit operation (chemical reaction); and outlet (106) of the processing device connected to a second inlet (106) of the micro component device through a second inlet; and the second array of microchannels connected to a second inlet (106) and a second exit (112) connected to said second array of microchannels; wherein, during operation, said stream (re-enters said micro component device and is distributed among the second array of microchannels where said first unit operation can again be performed on the stream, and said second stream exits through the second exit and exits the micro component device. (See pages 5-6 and Figure 1a).

Regarding claims 6 and 7, Tonkovich et al apparatus of Figure 1a, meets the limitations of the claims wherein the first layer is section 114 and the second layer is section 108. Regarding claim 10 the third layer is reaction section 100.

No difference is seen between the instantly claimed invention and Tonkovich et al disclosure.

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**Allowable Subject Matter**

9. Claims 2-5, 21, 35-40, 69, 70-72, and 78-87 have been allowed.

10. Claims 8, 9, 11, 12, 25-34, 50-53, 55-57, 59-68, 73 and 76 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11. The following is an examiner's statement of reasons for allowance: Claims 2-5, 21, 35-40, 69, 70-72, and 78-87 are allowable upon consideration of the prior art.

Regarding claims 2-5, and 69-72, the prior art fails to disclose or suggest that the heat exchanger has a thermal power density of at least 0.6 W per cubic centimeter and an exergetic efficiency of at least 80%.

Regarding claim 21, the prior art fails to disclose or suggest the method of exchanging heat in a microchannel device, comprising: providing a first stream in a microchannel that exchanges heat with a second stream, wherein the first stream remains in the microchannel and, subsequently, the first stream exchanges heat with a third stream without leaving the microchannel.

Regarding claims 35-40 and 77, the prior art fails to disclose or suggest that the second unit operation modifying the first stream comprises a chemical separation, with at least one reaction product being preferentially removed from a first stream.

Regarding claims 78-87, the prior art fails to disclose or suggest the steps of the cited claims.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue

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fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

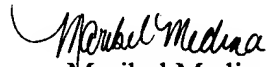
12. The following is a statement of reasons for the indication of allowable subject matter: Claims 8, 9, 11, 12, 25-34, 50-53, 55-57, 59-68, 73 and 76. The limitations of these claims are not disclosed or suggested by the prior art.

**Conclusion**

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maribel Medina whose telephone number is (571) 272-1355. The examiner can normally be reached on Monday through Friday from 7:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Maribel Medina  
Examiner  
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